

# Exams & Review Sessions

## **Midterm 1: September 27<sup>th</sup> (in class)**

*Review with Lecturers:* September 25th from 5:00 PM to 6:50 PM in 1GH 319

*Review with Teaching Assistants:* September 26th from 7:00-8:30 PM in 31 PSYCH

## **Midterm 2: October 30<sup>th</sup> (in class)**

*Review with Lecturers:* October 25th from 5:00 PM to 6:50 PM in 1GH 223

*Review with Teaching Assistants:* October 29th from 7:00-8:30 PM in 31 PSYCH

## **Midterm 3: December 11<sup>th</sup> (in class)**

*Review with Lecturers:* December 6th from 5:00 PM to 6:50 PM in 1GH 223

*Review with Teaching Assistants:* December 10th from 7:00-8:30 PM in 31 PSYCH

**1) Tuesday, Sept. 18: Theory of Mind**



**2) Thursday, Sept. 20: finish Theory of Mind  
Conceptual Development 1**

**3) Tuesday, Sept. 25: Conceptual Development 2**

Thursday, Sept. 27: EXAM 1

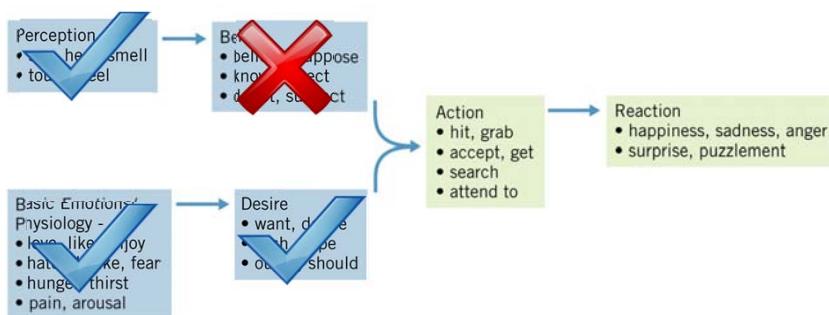
**4) Tuesday, Oct. 2: Eyewitness Testimony**

**5) Thursday, Oct. 4: Culture and Development**

# Theory of Mind continued

September 20, 2012

## Theory of mind prior to age 4



## The change-of-location false belief task

- 3-year-olds: BOX  
(incorrect)
- 4-year-olds: BASKET  
(correct)

Children younger than 4 can't reason about others' false beliefs.



## The unexpected-contents false belief task



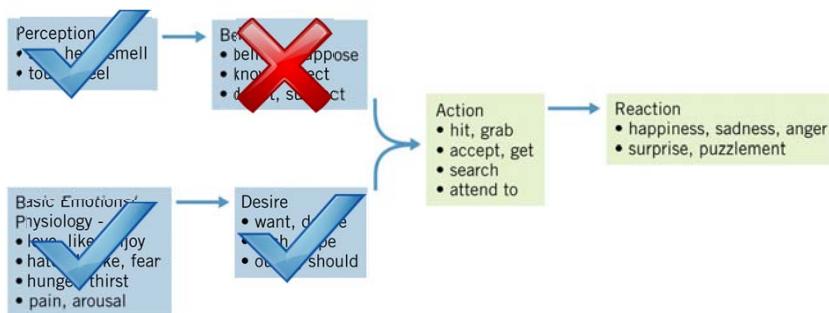
- 3-year-olds: ANIMAL CRACKERS (incorrect)
- 4-year-olds: CRAYONS (correct)

## Lying/deceiving

- Lying requires a representational theory of mind
  - Why?
  - Children can't deceive very well until they're 3 ½ - 4 years old.

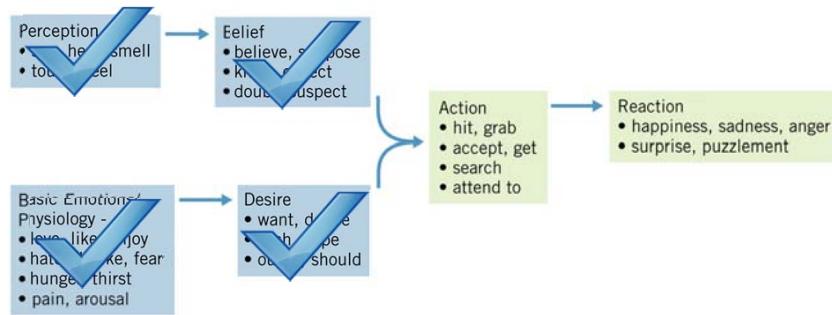
[video]

## Theory of mind prior to age 4



## However...

- Recent studies performed at the U of I show that even 15-month-olds can reason about false beliefs!!



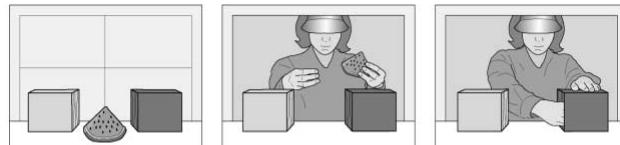
Onishi & Baillargeon (2005)

violation of expectation task

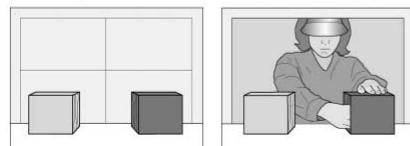
[movie](#)

## Onishi & Baillargeon (2005)

**A** Familiarization trial 1

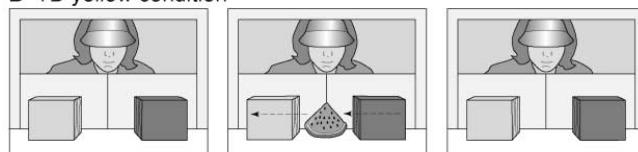


**B** Familiarization trials 2 and 3

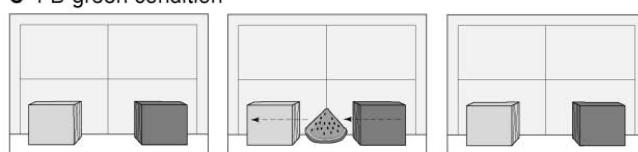


## Onishi & Baillargeon (2005)

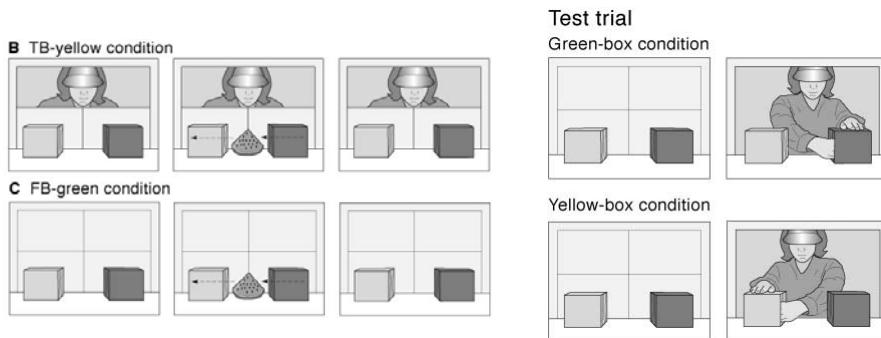
**B** TB-yellow condition



**C** FB-green condition



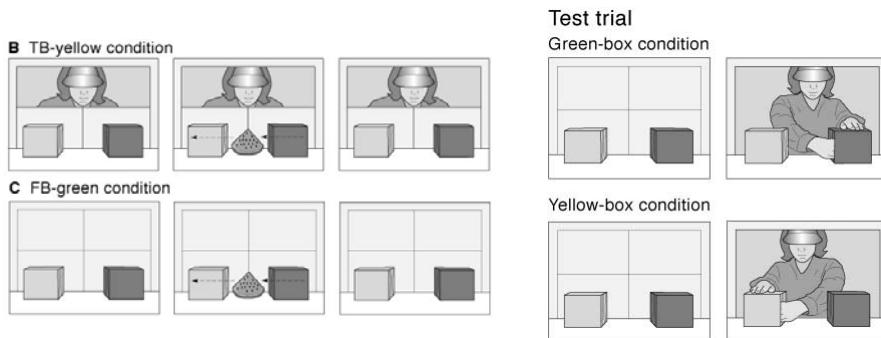
## Onishi & Baillargeon (2005)



True belief – yellow: look longer at reach into the green box

False belief – green: look longer at reach into the yellow box

## Onishi & Baillargeon (2005)



15-month-olds expect the actor to search for the toy where she believes it is.

15-month-olds seem to have a representational (belief-desire) psychology!

## What's going on?

- Why do 3-year-olds fail in the traditional false belief tasks?

Maybe these tasks are too hard (for reasons that don't have to do with children's understanding of false beliefs):

- lots of language
- multiple parties and locations to keep track of (e.g., Sally, Anne, experimenter, basket, box)
- children have to inhibit their knowledge of where the toy really is
- explicit judgment task

## What's going on?

- If you make the task less complex, even 2-year-olds can succeed:
  - “Hmm, I wonder where Sally will look for the marble...” – children look to the correct location

## Atypical development: Autism

- 1 in 166 births
- 1-1.5 million people in the U.S.
- 10-17% annual increase

(Autism Society of America)

## Core deficits in autism

- Social functioning
- Language and communication
- Repetitive behaviors
- Mental retardation

## Core deficits in autism

- Social functioning ← understanding other people's minds
- Language and communication
- Repetitive behaviors
- Mental retardation

## Core deficits in autism

**Table 1.** DSM-IV criteria for defining the social and communication deficits in autism

Social deficits	Language and communication deficits
Impairments in the use of eye gaze	Delay or absence of spoken language
Impairments in facial expression	Marked impairment in the ability to initiate or sustain conversation with others
Impairments in body posture and gesture	Idiosyncratic use of words or phrases
Failure to form peer relationships at appropriate developmental level	Lack of varied spontaneous pretend play
Lack of spontaneous sharing of enjoyment, interests, or achievements with others	Lack of social imitative play at younger developmental stages
Lack of social-emotional reciprocity	
Impaired response to other people's emotions	
Lack of adapting behaviour to different social contexts	
Weak integration of social, emotional, and communicative behaviours	

Tager-Flusberg, 1999

## An autistic person's description of the Heider & Simmel movie

"Starts when a small equilateral triangle breaks out of a square. A small sphere or circle appears and slides down the broken rectangle. The triangles were either equilateral or isosceles. Later the small, I think, isosceles triangle and sphere bounce around each other, maybe because of a magnetic field..."

Klin & Jones, 2006

*"MIND-BLINDNESS"*

## Impairment in reasoning about beliefs Baron-Cohen et al., 1985

- Autistic group  
(12 years old; nonverbal MA = 9 years; verbal MA = 5 years)
- Down Syndrome  
(11 years old; nonverbal MA = 6 years; verbal MA = 3 years)
- Typically developing controls  
(4 years old)  
(MA = mental age)

## Impairment in reasoning about beliefs Baron-Cohen et al., 1985



## Impairment in reasoning about beliefs Baron-Cohen et al., 1985

<i>Group</i>	<i>Percentage of children who answered correctly</i>
Autism	20%
Down	86%
Control	85%

# Early Conceptual Development I

September 20, 2012

## Outline

- What are concepts? What are they for?
- What do we have concepts of?
- How are concepts represented? What's their structure?
- What's the nature of children's concepts?

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### *Funes, the Memorious* by Jorge Luis Borges

He remembered the shapes of the clouds in the south at dawn on the 30th of April of 1882, and he could compare them in his recollection with the marbled grain in the design of a leather-bound book which he had seen only once, and with the lines in the spray which an oar raised in the Rio Negro on the eve of the battle of the Quebracho. [...]

In effect, Funes not only remembered every leaf on every tree of every wood, but even every one of the times he had perceived or imagined it.

*Funes, the Memorious*  
by Jorge Luis Borges

He was, let us not forget, almost incapable of general, platonic ideas. It was not only difficult for him to understand that the generic term "dog" embraced so many unlike specimens of differing sizes and different forms; he was disturbed by the fact that a dog at three-fourteen (seen in profile) should have the same name as the dog at three-fifteen (seen from the front). His own face in the mirror, his own hands, surprised him on every occasion.

Does Funes have concepts?  
Why, or why not?

The story of Funes illustrates exactly why concepts matter...

- Concepts organize our experiences
  - allow learning of regularities about the world
  - allow generalization and prediction

The story of Funes illustrates exactly why concepts matter...



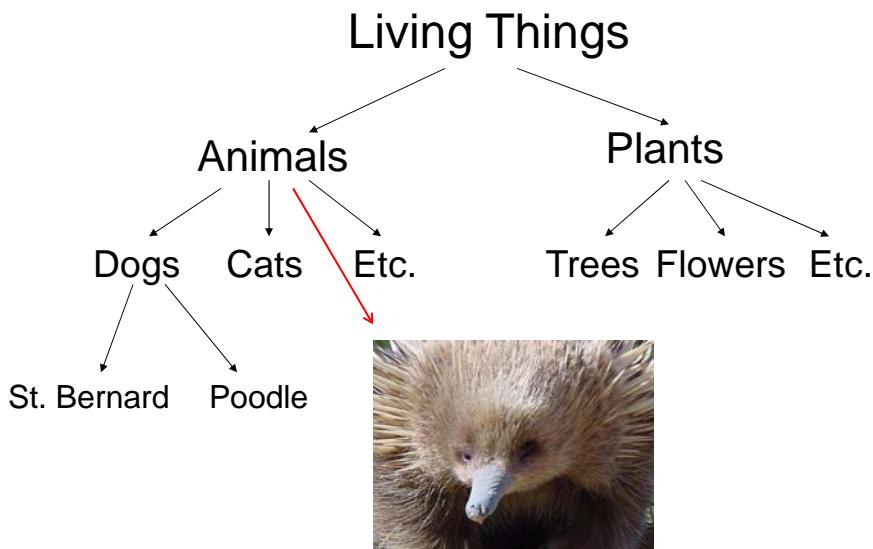


- is alive, is a dog, is a mammal, is an animal, is young, has a wet nose, has tail, has red blood, barks, likes to lick people, walks on four legs, plays with toys, eats dog food, drinks water out of a bowl, digs in the yard, will become sick if eats chocolate, chases cats, has a heart, lungs, brain, will grow, may rescue people in the winter, carries alcohol...

## Concepts are powerful

- Allow many inferences and predictions about never-before-seen objects in new situations (like in the puppy example)
- Put our experience to work for us and thus save us tremendous mental effort

## Hierarchical organization



## Outline

- What are concepts? What are they for?
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## What do we have concepts of?

Concrete, observable entities:

- living things (puppies, lobsters, tulips)
- artifacts (tools, tables)
- food (strawberries, ham)
- non-living natural objects (rivers, hills, clouds)
- places (parks, schools, classrooms)

... and so on

## What do we have concepts of?

Events:

- parties
- weddings
- birthday dinners
- graduations
- etc.

Activities:

- making the bed
- taking a course
- mowing the lawn
- cleaning the house
- etc.

## What do we have concepts of?

Abstract entities:

- truth
- justice
- intelligence
- culture
- etc.

Scientific entities:

- electron
- atom
- force (gravity, etc.)
- gene
- etc.

## What do we have concepts of?

People:

- White, African American, Asian, Hispanic, etc.
- lower-, middle-, or upper-class
- male, female
- doctors, lawyers, etc.
- jocks, nerds
- etc.

## Most common (and most studied) types of concepts

1. Natural kinds
2. Artifacts
3. Social categories

### Natural kinds



- Biological or geological entities, like plants, animals, rocks, clouds, mountains
- Naturally-occurring
- Discovered rather than invented/created
- Category members share many external (e.g., perceptual, behavioral) and internal (e.g., biological, chemical) characteristics



## Artifacts



Click to Enlarge

- Human-created objects, like cars, tools, and furniture
- Category members share perceptual and functional characteristics



## Social groups and categories

- Categories of people (e.g., females, males, children, the elderly, African Americans, a football team, etc.)
- Category members share some perceptual and (in some cases) biological characteristics



## Outline

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What is the structure of concepts?  
How do people represent  
categories of things in the world?

A first idea: defining features (1950s  
and 1960s)

Each concept consists of a set of  
features that define membership in  
the corresponding category.

What is the structure of concepts?

How do people represent categories of things in the world?

A first idea: defining features (1950s and 1960s)

The concept “bachelor” =

- male
  - unmarried
  - of marriageable age
- } individually necessary  
jointly sufficient

### The classical view (defining features)

Individually necessary:

Anyone who is not a male or unmarried or of marriageable age is not a bachelor. All of these are necessary.

Jointly sufficient:

Anyone who is a male & unmarried & of marriageable age must be a bachelor.  
Nothing else is needed.

Let's try to work through an example...

Let's pick a concept – say, dog.

What are the defining features?

Are they individually necessary and jointly sufficient?

## The probabilistic view (1970s, 1980s)

Problems with the “classical view”  
based on defining features:

- trouble coming up with defining features for everyday concepts (e.g., dog, game)
- And here's another one:

## The probabilistic view (1970s, 1980s)

Which one of these is a better example of the category BIRD?



Robin



Penguin

## The probabilistic view (1970s, 1980s)

Problems with the “classical view”  
based on defining features:

- trouble coming up with defining features for everyday concepts (e.g., dog, game)
- not all category members seem equally typical, as assumed by the classical view

## The probabilistic view (1970s, 1980s)

Rather than having defining features, concepts have a “family resemblance” structure (Eleanor Rosch).

“The instances resemble each other to varying degrees and in varying ways, much like different family members do, but there is no set of features that all of them possess” (Siegler, 2005)



## The probabilistic view (1970s, 1980s)

- No feature is necessary or sufficient.
- Instead, all features are probabilistically related to category membership.
- Features have different weights or “strengths.”
- The more category features an object has, the more prototypical it is of that category.



## The probabilistic view (1970s, 1980s)

### BIRD:

has wings	.95
flies	.90
has feathers	.88
...	
is brown	.45
...	
is red	.13

(I made up the numbers.)



## The probabilistic view (1970s, 1980s)



doesn't fly – less prototypical  
(b/c it's missing a feature  
that's strongly associated  
with the category)

## The concepts-in-theories view

The problem with the probabilistic view is that it ignores the extensive causal knowledge people have about the features of a category.

- e.g., “have wings” and “can fly” are not just unrelated features – one enables the other

## The concepts-in-theories view



1. What's the percentage of curved bananas?  
What's the percentage of curved boomerangs?
2. Is a straight banana an okay banana?  
Is a straight boomerang an okay boomerang?

Medin & Shoben, 1988

## The concepts-in-theories view

The problem with the probabilistic view is that it ignores the extensive causal knowledge people have about the features of a category.

- e.g., “being curved” is equally true of bananas and boomerangs (same probabilistic feature “strength”), but a straight boomerang is a much worse example of a boomerang than a straight banana is of the category *banana*

Concepts are embedded in intuitive theories about how the world works.

## The concepts-in-theories view

What are some features of the concept “drunk” (as in “intoxicated”)?

Here’s a story about a party I went to last night.

“jumping into a pool with one’s clothes on” – not quite a typical feature of the concept “drunk” but we can nevertheless use it to categorize somebody as drunk (Murphy & Medin, 1985)

## Outline

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## How about children's concepts?

For a long time, young children's concepts were viewed as

- perceptually-based
- concrete
- “atheoretical”

Flavell (1977): young children are “prone to accept things as they seem to be, in terms of their outer, perceptual, phenomenal, on-the-surface characteristics”

## Example 1: Piaget

Preoperational children (younger than about 7) focus on static, superficial features.



## Example 2: Shape bias

When learning a new word, preschool-age children seem to use it for things of the same shape, even if they are from different categories.

This is a dax in puppet language.



3-year-olds: 68% shape choices



taxonomic



shape



thematic

Figure 1. Sample material set used for Experiments 1 through 3.

Which of these is another dax?

Imai et al., 1994

## Example 3: Transformation task (Keil)

Natural kind



TABLE 3-1 Examples of Keil's Transformations Procedure

### NATURAL KIND: RACCOON/SKUNK

The doctors took a raccoon (show picture of raccoon) and shaved away some of its fur. They dyed what was left all black. Then they bleached a single strip all white down the center of its back. Then, with surgery (explained to child in preamble), they put in its body a sac of super smelly odor, just like a skunk has (with younger children "odor" was replaced with "super smelly yucky stuff"). When they were all done, the animal looked like this (show picture of skunk). After the operation was this a skunk or a raccoon? (Both pictures were present at the time of the final question.)

## Example 3: Transformation task (Keil)

Natural kind



Raccoon/Skunk

4-year-olds: racoon is now a skunk

2<sup>nd</sup> graders: still a racoon

Are young children really that limited?

Can they really not go beyond surface  
appearances?

One reason to doubt this claim:

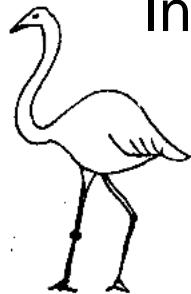
children's understanding of others' minds!

### Some early evidence from preschoolers' generalization

Would children generalize information from one object to another on the basis of perceptual similarity or kind membership (when the 2 are dissociated)?

Gelman & Markman, 1986

## Inductive Inference



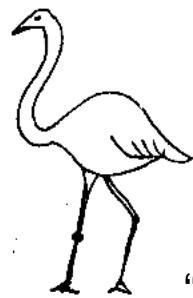
Look at this bird. It feeds its babies mashed up food.



Look at this bat. It feeds its babies milk.

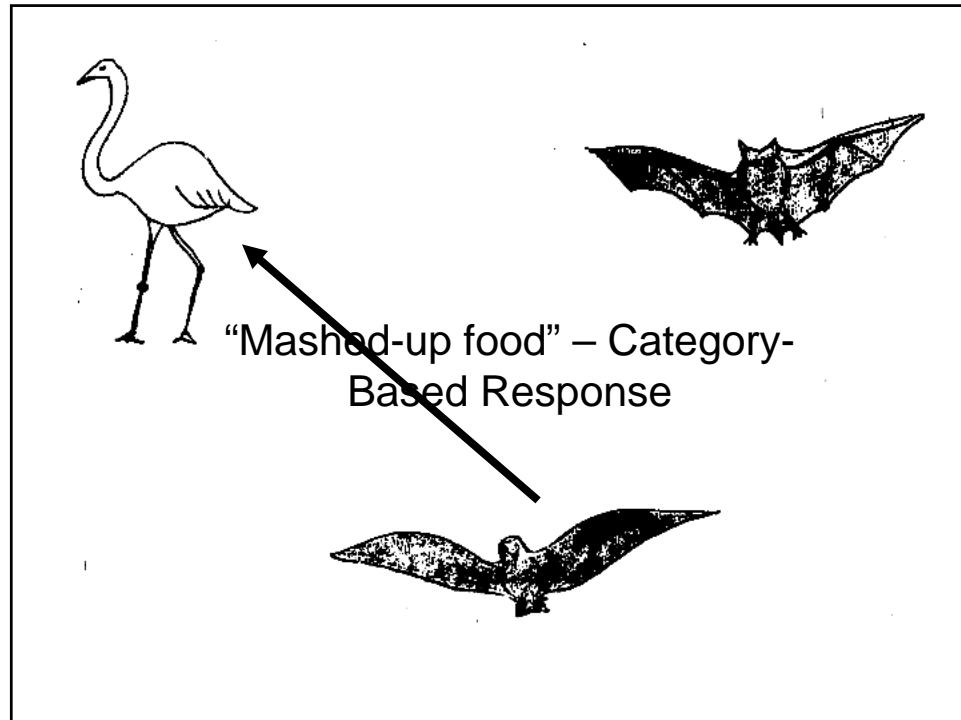


Look at this bird. Does it feed its babies milk or mashed up food?



“Milk” – Perceptually-Based Response

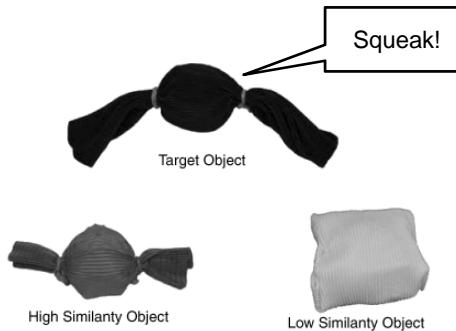




### Gelman & Markman, 1986

- 68% of 4-year-olds generalize from the other, perceptually dissimilar, category member (e.g., the flamingo)

## A similar demonstration in 13-month-olds!

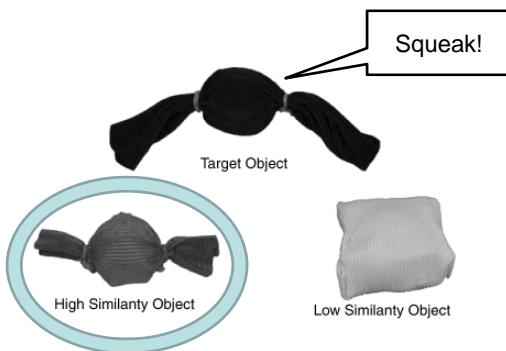


Both test objects are disabled – how hard will infants try to produce the sound?

Graham, Kilbreath, & Welder, 2004

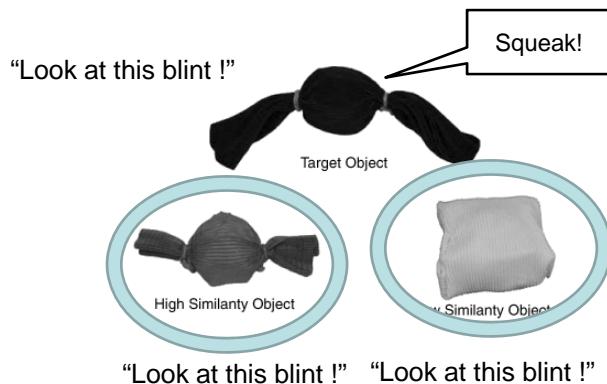
## A similar demonstration in 13-month-olds!

NO LABEL condition: "Look at this one!"



## A similar demonstration in 13-month-olds!

LABEL condition: “Look at this blint !”



This means that ...

- Even at 13 months, infants can go beyond appearances and expect 2 dissimilar-looking things that have the same name (and are thus part of the same category) to share a nonobvious property

To be continued...